# Myths and Realities of Electronic Laboratory Reporting


**Susan May, MT(ASCP)***
**Raymond D. Aller, M.D.***
**Michael Davisson****
**Irene Culver***

***Bioterrorism Preparedness and Response Section**
**Acute Communicable Disease Control Program**
**Los Angeles County Department of Health Services**
**And **Washington State Public Health**


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# A Caveat on this Slide Set

- This is an exceedingly dynamic field, with new knowledge and insights every day.
- This slide set was finalized for submission to the PHIN CD almost two weeks prior to the presentation.
- It is likely that multiple changes will be made between now and May 10.
- An updated version will be given to the conference logistics staff prior to the presentation.

# Learning Objectives

1. Identify common challenges in connecting LIS to public health for disease reporting
2. Enumerate misconceptions held by both PH and IT professionals, that often delay progress
3. Cite practical experience in resolving these challenges, and in dispelling the misconceptions
4. Describe additional data useful to the public health mission, that can be included in ELR

# Los Angeles County

- 10 million people
- 30,000 physicians
- ~~82 79 77~~ 75 hospitals with Emergency Departments
- 30 other hospitals
- 500 labs – but most not ELR candidates
- 4,000 square miles

# Electronic Lab Reporting (ELR)

- Software on the laboratory information system automatically selects from all laboratory results, those which are reportable to public health
- In other cases, ALL results transferred to a filtering system, that selects reportables
- In some cases, these are enhanced by other findings of public health importance
  - Antimicrobial susceptibility testing
  - Syndromic indications

# ELR Myths and Misconceptions

- "we'll hook up 3 labs by 3 months from now – now what were their names?"
- A lab – "sure, we can send you HL7"
- If a lab sends manual reports to 5 jurisdictions, they'll have to set up that many electronic interfaces
- If my results are sent to some other jurisdiction, that will delay us receiving them.
- If lab results are first received by the state, they won't get forwarded to the appropriate locality

# ELR Myths and Misconceptions 2

- The license fees for SNOMED and LOINC are too expensive
- “Most labs use LOINC, right?”
- 15 labs in town run Cerner, so we only have to do 1 LOINCing.
- Your HL7 is already formatted for printing?
- They LOINCed all their labs 5 years ago, so we’re in good shape.

# What is ELR?

- Unbroken (no manual steps) electronic linkage between the database of the laboratory's information system and the database of the public health disease reporting system.
  - HL7 format
  - Flat file format
- Types of data that may be sent: immunology, microbiology, tumor diagnoses
- Systems the data is sent to: communicable disease reporting systems, syndromic surveillance systems, tumor registries

# What about ?

- Manual running of an LIS extract, then sending the file to Public Health - Not ELR
- Web page to enable a (small) lab to enter cases directly to the PH database - Maybe ELR.

# History of ELR

- First live link that we know of – 1977, between a surgical pathology system and a tumor registry.
- HL7 standards adapted for clinical lab ELR in late 90's
- Widespread adoption in this decade

# What is Current Status?

- NY State – 40 HL7, 25 flat file (120 via web)
- Los Angeles County –
  - HL7 -- 6 hospitals (1 lab)
  - Flat file – 1 hospital, 1 reference lab
  - (web) – 12 hospitals
- Rest of 62 CDC-funded jurisdictions at various stages. Survey will be updated over the next few months.

# Why Electronic Lab Reporting?

- Community/clinician reporting rates abysmal (often <5%)
- Laboratories typically have much better administrative organization
- Positive laboratory findings more definitive than a clinical impression
- Even without ELR, labs often achieve 50% or better reporting rates.
- ELR permits close to 100% reporting rates

# ELR Benefits to the Lab

- Results to PH as soon as available – compliance with <24-hour reporting law
- Every case that meets criteria is sent automatically
- Some states now mandate electronic reporting (NY all tests, Calif. mandates blood lead)
- HIPAA disclosure records complete
- Lab staff time savings.

# A Caveat on Rapid Reporting

- When we initially implemented a large HMO laboratory, results were transmitted to us immediately – and immediately loaded into our confidential morbidity reporting/case follow-up system
- District nurses would contact the patient for follow-up – but sometimes the patient hadn't yet heard about the result from their physician!
- Therefore, we built a 23-hour delay into this interface, to ensure that the physician had enough time to receive the results, and discuss them with the patient, before our public health nurses call

# ELR Implementation

- Format – HL7 v2.3.z, v2.3.1 +
- Security
- Codes converted from local to standard
  - Result names standardized – LOINC
  - Result values standardized – SNOMED
  - Specimen source – HL7 table, SNOMED
  - Appropriate tests/results to send – "Dwyer/Sable tables"

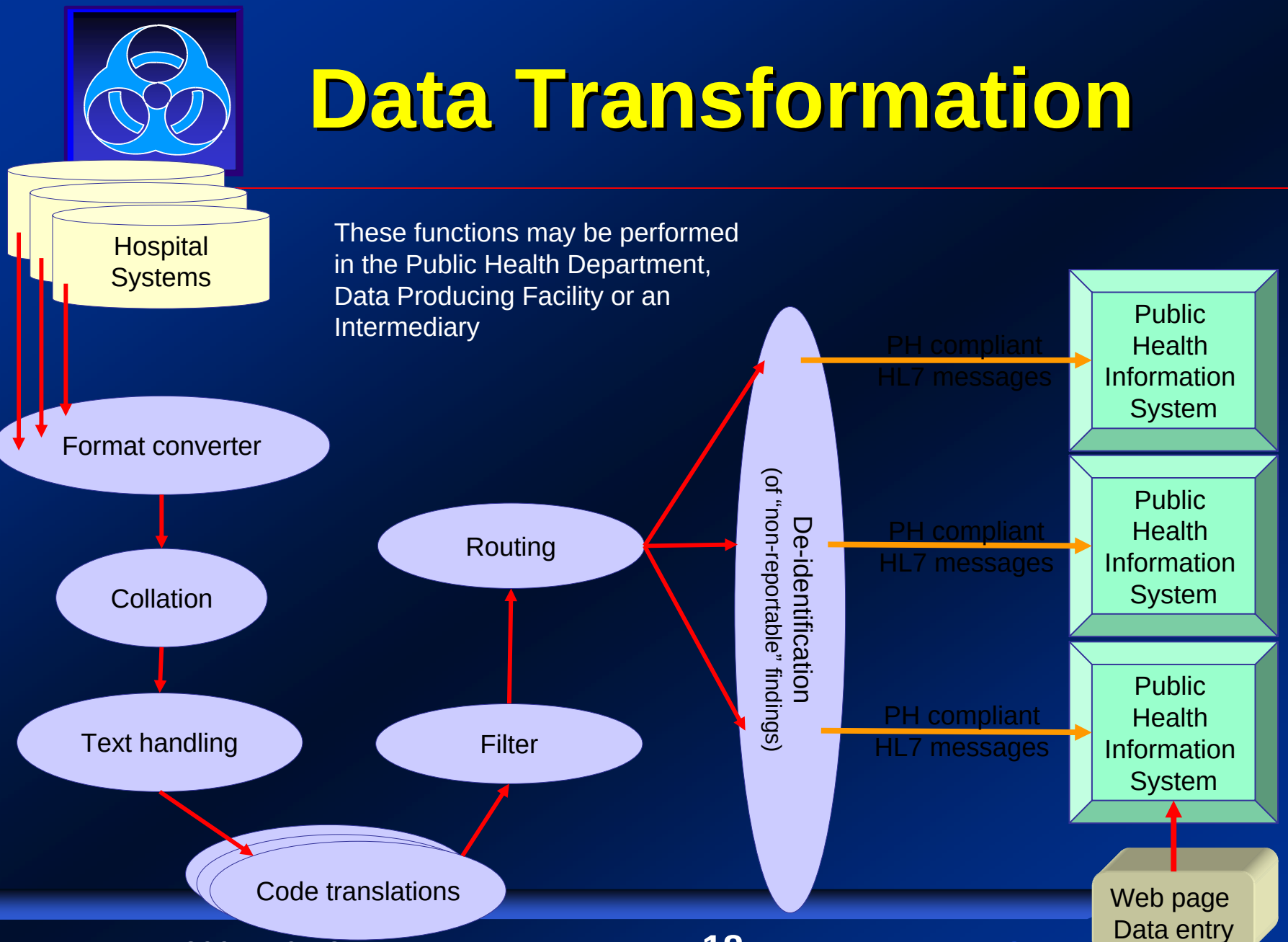
# LOINC

- Logical Observation Identifier Names and Codes
- Published beginning in 1994
- Freely available – copyright but royalty free
- Now mandated by Federal government for all governmental healthcare programs (VA, DOD, IHS).
- The standard for reporting of public health data.
- Future standards for physicians office systems
- www.loinc.org

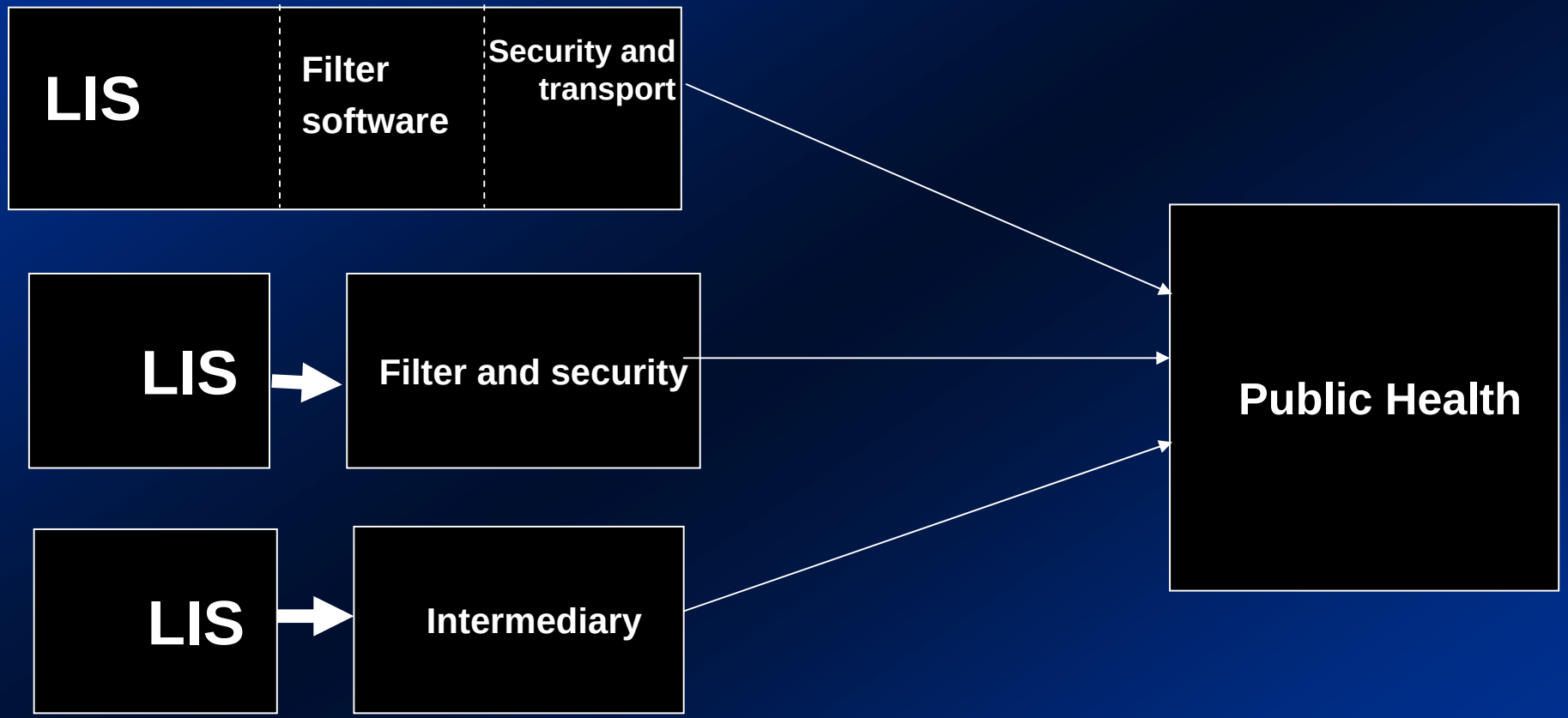
# SNOMED

- Systematized Nomenclature of Medicine
- Under development since the late 60's
- Encompasses all areas of clinical medicine
- Mandated for all medical records in the UK
- Also used by many organizations (Kaiser) and countries
- Licensed for use throughout the United States.
- www.snomed.org

# Data Transformation

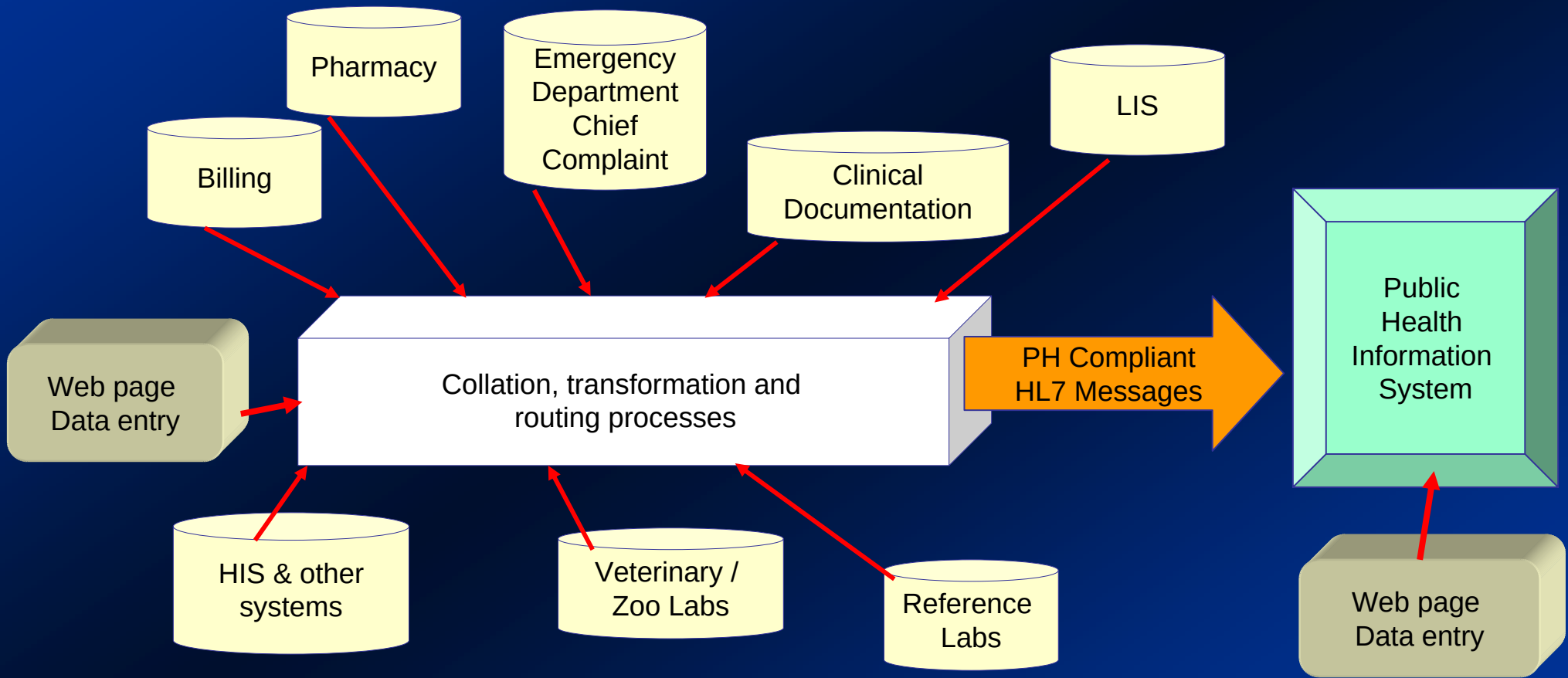


# LIS to Public Health



# Conceptual Architectural Overview

All are Data Producing Facilities (DPFs)



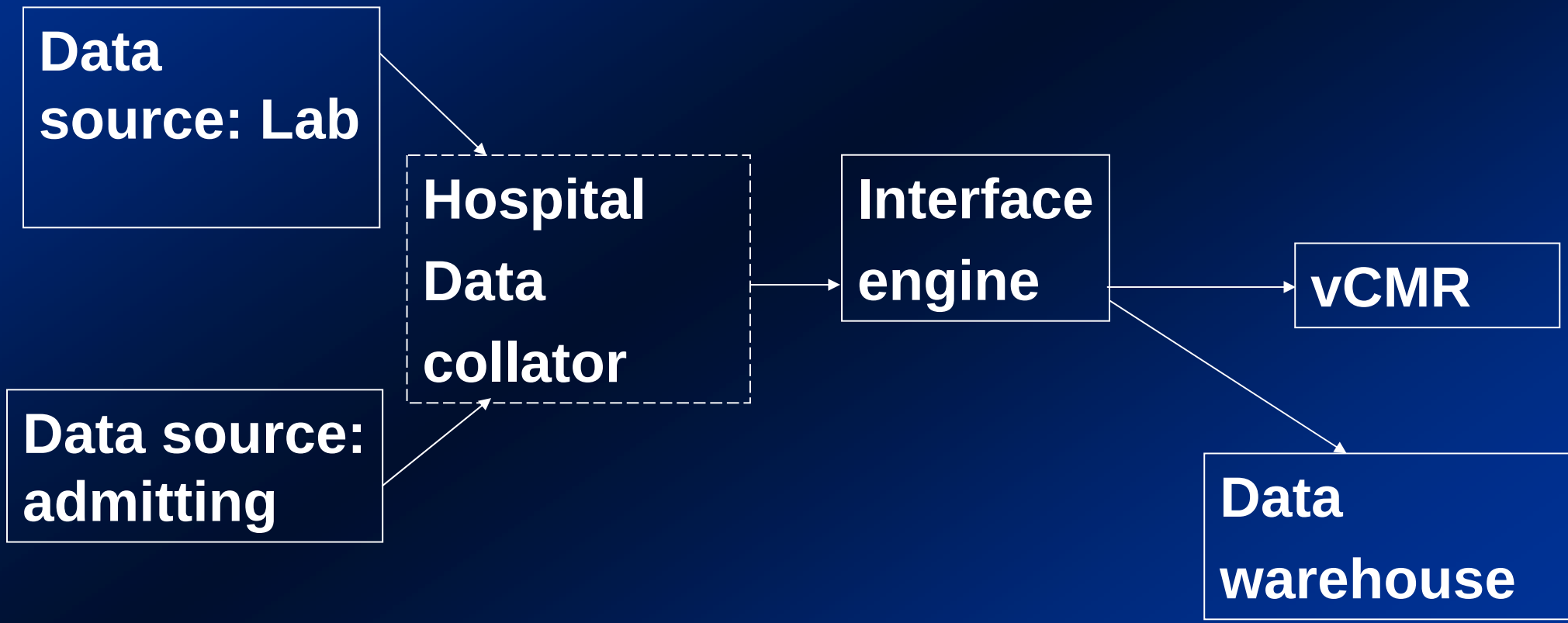
# The Problem of Address …

- Patient address/phone number essential for PH follow-up
- Clinicians typically have this in their office records
- Many laboratories *don't* have patient address in their information systems
  - Hospital lab – address in admitting system, not in LIS
  - Reference lab – very rarely does the requesting lab give patient address to the performing lab
  - Commercial lab – result often available only with "mini-log" information – may be another day or two before "maxi-log" is completed.
- In any case, don't refer to these as "demographics" – those are primarily patient name/birth date –and labs DO give those

# Addressing the Problem …

- Hospital interface may need feeds from both admitting/interface engine and from LIS
- Reference lab –
  - Long term – change order entry interface specification to include address
  - Short term – a lot of manual work to gather that information
- Commercial lab –
  - Two transmissions to public health –
    - One when results are available
    - A second when maxilog is done (address data available)
  - Implication – PH systems must be capable of handling both transmissions.

# Architecture to Get Address into Hospital Lab Result Report



# Do a Census of What LIS's are Installed in Your Jurisdiction

- (hypothetical)
- Cerner 25
- Mckesson 8
- Misys 14
- Meditech 19
- CCA 2
- Schylerhouse 3
- Homegrown/ancient orphans 3

# A Matter of Terminology

- Clinical labs (hospital and community) run Laboratory Information Systems (LIS)
- Research and pharmaceutical labs run Laboratory Information Management Systems (LIMS)
- Public Health labs run a set of applications much closer to a typical LIS than to a typical LIMS
- When talking to your hospital partners, use the right terminology.

# How Do I Learn More About These LIS's?

- CAP Today November each year – cap.org
- LabInfoTech summit
- CLMA meeting
- Company websites
- Future: database of PH interface contact person at each vendor

# What Didn't I Ask?

- What product? – for example:
  - McKesson – had acquired 7 LIS products – all but one now sunsetted/orphans.
  - Cerner – had acquired at least four LIS's – now sunsetted
  - If the lab is on anything other than the vendor's main line product, you may have to go it without vendor support.
- What release? – e.g., Misys PH interface software only available for release 5.3.3 and above.

# To Do a LOINCing

- Download lab's test dictionary
- Test name, test code, units, method, specimen type
- Public Health staff or outside services
- Probably not the lab

# LOINCing of the Laboratory Database

- Why:  every lab uses a different set of test codes
- How:  RELMA utility, other tools
- Gotcha's –
  - Many possible matches, at first glance
  - Look at multiple parameters (units, method, specimen type, etc.) to distinguish
  - Often have to call knowledgeable people in the lab to figure out what they mean.

# How Many LOINCings Do I Need to Do?

- If I have 8 Cerner Classic sites in my jurisdiction, that reduces the number – right ??
- Unfortunately, every laboratory has built it's very own, unique laboratory test codes.
- In more recent years, some LIS vendors have provided a "starter set" of codes – but in many cases, the lab was converting from a previous LIS from a different vendor – and chose to stay with the long-familiar codes.

# What Data is Transmitted

- Reportable diseases
  - Supporting lab findings – liver enzymes and bilirubin on cases of positive hepatitis serology
- Antimicrobial susceptibility testing – on ALL organisms
- Lab orders that may help define syndromes

# Antimicrobial Susceptibility Testing

- Antimicrobial resistance is an increasing problem in all communities
- Traditional – collect antibiograms from hospitals
- Alternative – collect raw susceptibility results from labs, perform calculations at public health.

# Syndromic Surveillance

- Real-time public health surveillance using data that is routinely collected for other purposes
- Not to identify individuals, but to detect atypical patterns of symptoms, orders, findings
  - Therefore, data can be de-identified
- Real time transmission, analysis, and alerts

# Lab Order Defined Syndromes

- Blood cultures:  fever
- Stool cultures: GI
- Sputum cultures: respiratory
- CSF cell counts: meningeal (e.g., West Nile)
- This is a nascent area – may be better to get ALL orders, as we learn what constitutes a useful pattern
- The BioSense – LabCorp experience

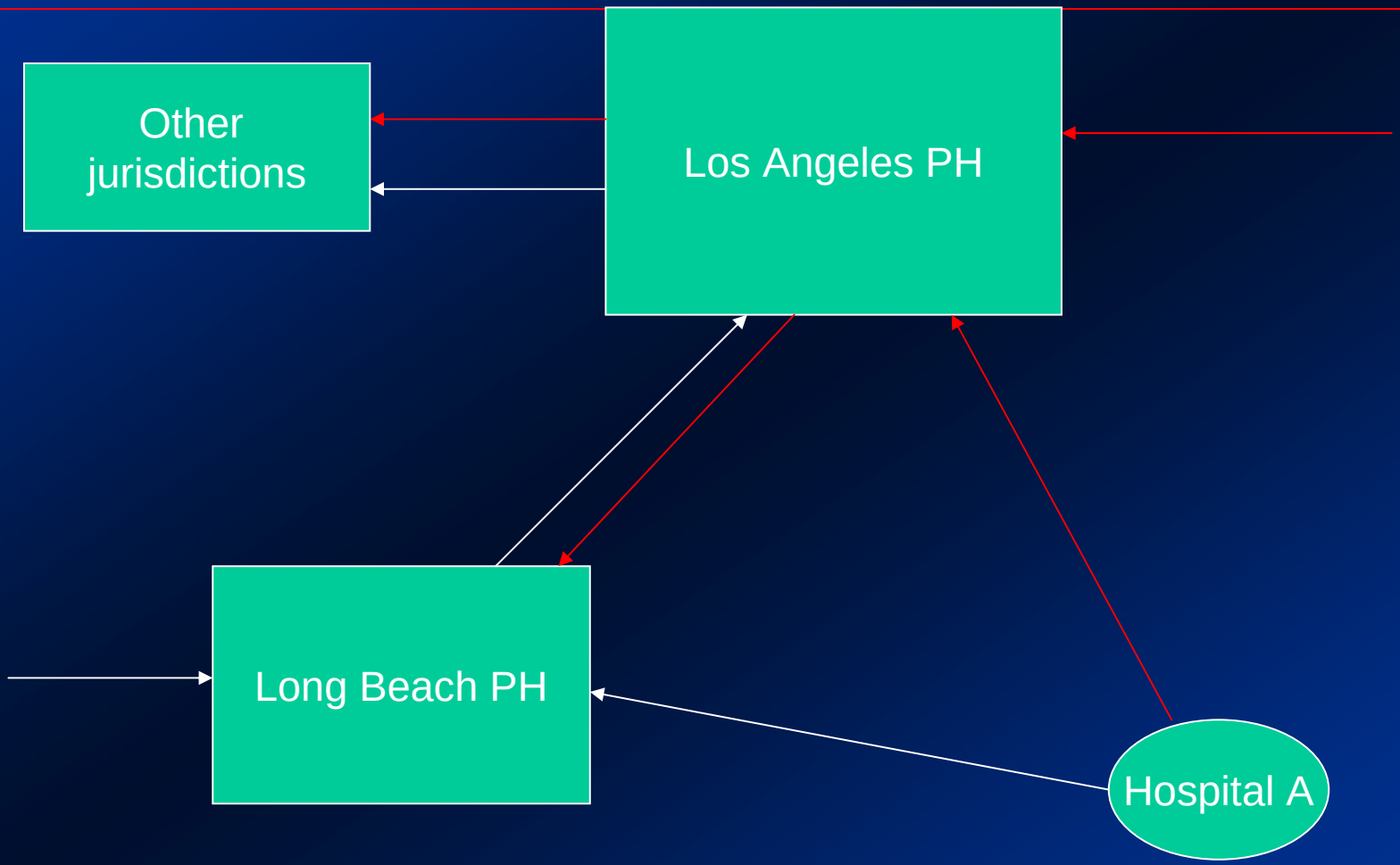
# Cost

- Cost of manual reporting – 0.50 to $5 per case
- Interface
  - Initial – license fees, implementation
  - Ongoing –
    - Direct link - maintenance fees
    - Intermediary - monthly use fee.

# What if I Get Data for Patients Living in Other Jurisdictions?

- Recommendation: immediately (milliseconds) route that data in HL7 2.3.1 format, to:
  - the appropriate jurisdiction (e.g., San Diego county) or
  - A more encompassing unit (e.g., the State of California)
- Objective:
  - Short term: labs should have to build interfaces to only one PH agency in a state – who will then route as appropriate.
  - Long term: labs should build interface to only one PH agency period – who will then route results wherever they belong in the US

# Data Flow for Surveillance



# Key Steps

- Getting the data
- Analyzing the data
- Disseminating the findings

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# Key Points

- No manual work by hospitals
- Rapid detection of nasty disease, tracking slower public health menaces
- Implementation requires expert and experienced technical support
- This is a process that can easily take months – or years
- HIPAA compliant

# References

- Will be provided with the May 10 version of these slides

# Questions?

- Sue May, MT(ASCP)
- smay@ladhs.org
- 213-989-7049

- Ray Aller, M.D.
- raller@ladhs.org
- 213-989-7208